

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
4 November 2004 (04.11.2004)

PCT

(10) International Publication Number  
**WO 2004/094642 A3**

- (51) International Patent Classification?: **C12N 15/79**, 15/867, A61K 48/00
- (21) International Application Number: **PCT/IT2004/000227**
- (22) International Filing Date: 21 April 2004 (21.04.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/465,080 24 April 2003 (24.04.2003) US
- (71) Applicant (for all designated States except US): **FONDAZIONE CENTRO SAN RAFFAELE DEL MONTE TABOR [IT/IT]**; Via Olgettina, 60, I-20132 Milano (IT).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **NALDINI, Luigi** [IT/IT]; c/o Fondazione Centro San Raffaele del Monte Tabor, Via Olgettina, 60, I-20132 Milano (IT). **AMENDOLA, Mario** [IT/IT]; c/o Fondazione Centro San Raffaele del Monte Tabor, Via Olgettina, 60, I-20132 Milano (IT). **VIGNA, Elisa** [IT/IT]; c/o Fondazione Centro San Raffaele del Monte Tabor, Via Olgettina, 60, I-20132 Milano (IT).
- (74) Agents: **CAPASSO, Olga et al.**; De Simone & Partners S.P.A., Via Vincenzo Bellini 20, I-00198 Roma (IT).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— with international search report
- (88) Date of publication of the international search report: 12 May 2005
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LENTIVIRAL VECTORS CARRYING SYNTHETIC BI-DIRECTIONAL PROMOTERS AND USES THEREOF

(57) Abstract: It is described a bidirectional promoter for expression of at least two coding sequences in opposite direction in animal cells; bidirectional expression cassettes; expression constructs; gene transfer expression vectors, and methods for the use thereof.

WO 2004/094642 A3

# INTERNATIONAL SEARCH REPORT

International Application No

PC .. T2004/000227

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/79 C12N15/867 A61K48/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS, CHEM ABS Data, EMBASE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages *	Relevant to claim No.
P,Y	YU XIAOBING ET AL: "Lentiviral vectors with two independent internal promoters transfer high-level expression of multiple transgenes to human hematopoietic stem-progenitor cells." MOLECULAR THERAPY : THE JOURNAL OF THE AMERICAN SOCIETY OF GENE THERAPY. JUN 2003, vol. 7, no. 6, June 2003 (2003-06), pages 827-838, XP002303041 ISSN: 1525-0016 the whole document	1-16
P,Y	WO 03/087294 A (UNIVERSITAETSKLINIKUM HAMBURG ; BLOCK ANDREAS (DE)) 23 October 2003 (2003-10-23) the whole document	1-16
	----- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

15 November 2004

Date of mailing of the international search report

10/12/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Armandola, E

# INTERNATIONAL SEARCH REPORT

International Application No  
PC 12004/000227

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,Y	FUX CORNELIA ET AL: "Bidirectional expression units enable streptogramin-adjustable gene expression in mammalian cells." BIOTECHNOLOGY AND BIOENGINEERING. 5 SEP 2003, vol. 83, no. 5, 5 September 2003 (2003-09-05), pages 618-625, XP002303042 ISSN: 0006-3592 the whole document	1-16
Y	FUX CORNELIA ET AL: "Toward higher order control modalities in mammalian cells: Independent adjustment of two different gene activities." BIOTECHNOLOGY PROGRESS, vol. 19, no. 1, 18 January 2003 (2003-01-18), pages 109-120, XP002305563 ISSN: 8756-7938 the whole document	1-16
A	UNSINGER J ET AL: "Retroviral vectors for the transduction of autoregulated, bidirectional expression cassettes." MOLECULAR THERAPY : THE JOURNAL OF THE AMERICAN SOCIETY OF GENE THERAPY. NOV 2001, vol. 4, no. 5, November 2001 (2001-11), pages 484-489, XP002258698 ISSN: 1525-0016 the whole document	1-16
P,A	US 6 630 324 B1 (BARSKI OLEG A ET AL) 7 October 2003 (2003-10-07)	1-16
P,A	UNSINGER J ET AL: "Stable and strictly controlled expression of LTR-flanked autoregulated expression cassettes upon adenoviral transfer" BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS, ACADEMIC PRESS INC. ORLANDO, FL, US, vol. 319, no. 3, 2 July 2004 (2004-07-02), pages 879-887, XP004512521 ISSN: 0006-291X the whole document	1-16

# INTERNATIONAL SEARCH REPORT

ational application No.  
PCT/IT2004/000227

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:  
  
Although claims 13-18 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC T2004/000227

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
WO 03087294	A	23-10-2003	DE	10222513 A1	30-10-2003
			WO	03087294 A2	23-10-2003
<hr/>					
US 6630324	B1	07-10-2003	NONE		
<hr/>					